





# Treatment of Coloured Waters

*"ZENON's nanofiltration technology exhibits very high removal of disinfection byproduct precursors. With the low operator interface required with a membrane based solution as opposed to conventional chemical addition technologies, nanofiltration offers considerable advantages."*

R.P. Canning  
Manager, Process Engineering  
Zenon Environmental Inc.  
Burlington, Ontario

## THE COMPANY

ZENON Environmental Inc. is an advanced technology company which provides a comprehensive range of environmental and engineering services to industries, consultants, and governments. The company currently employs over 200 people in its offices in Canada, the U.S. and Europe. ZENON's head office is located in Burlington, Ontario where over 45,000 square feet of space is dedicated to office, laboratory, pilot plant and manufacturing facilities. ZENON specializes in providing innovative and cost effective solutions to complex problems.

## THE CHALLENGE

Many surface drinking water supplies are highly coloured. The bulk of soluble organics present in natural water supplies consist of humic materials. These compounds are relatively large molecular weight polar organics that attribute the yellow to brown colour in some surface supplies.

Many small communities in Northern Ontario and Quebec which draw water from coloured surface supplies often have serious problems when chlorinating. In fact, after chlorination, Tri-Halo-Methane (THM) concentrations in these drinking waters can be elevated above the federal guideline of 350 mg/L. Health officials are concerned over the implications these elevated concentrations of THMs have in drinking waters.

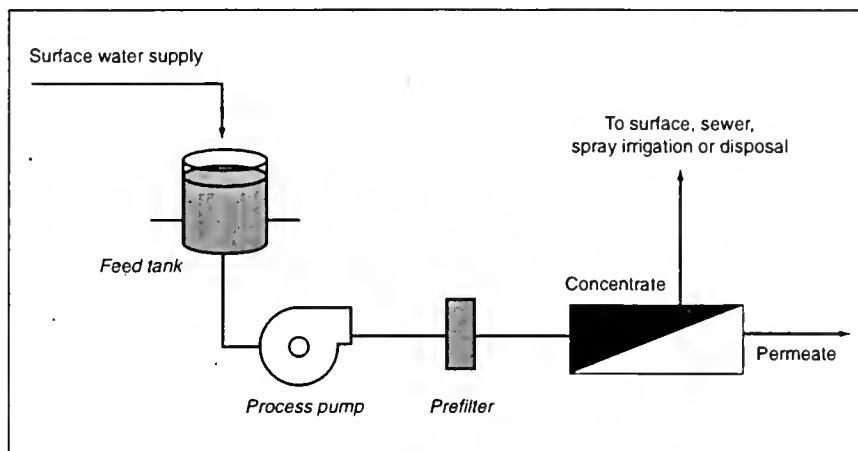


Figure 1 - Schematic of Nanofiltration System

Providing high quality water to remote communities has often meant using small package plants staffed by skilled operators who must regularly adjust chemical dosages in response to changing feed conditions. Further complicating the process is that the removal of disinfection by-product precursors (DBPs) under these conditions is often difficult. It is necessary to identify and develop technologies which are suitable for small communities and can achieve THM levels at the lowest cost possible.

## TECHNOLOGY DESCRIPTION

The process train is shown schematically in Figure 1. Membrane technology offers a potential solution by removing trihalomethane precursors prior to chlorination. This technology has been widely used for removal of colour from groundwater sources,

and ZENON's new nanofiltration module has now expanded the application of this advanced technology to surface waters.

## RESULTS

Table 1 shows the results of the technical demonstration. The nanofiltration system removed from 50 - 90% of the THMFP (Trihalomethane Formation Potential) from the surface water. High removals were also achieved for colour, TOC and turbidity.

## TECHNOLOGY OPPORTUNITIES

ZENON will continue the commercialization of its nanofiltration technology by undertaking additional demonstration and full scale treatment work. This will generate opportunities for selling other systems. The company is currently seeking suitable candidate sites.

Parameter	Raw Water	Permeate	% Removal
Colour (TCU)	25 - 110	0 - 6	94 - 99%
TOC (mg/L)	1 - 15	0.4 - 3	60 - 85%
THMFP* (µg/L)	50 - 1350	6 - 175	50 - 90%
Turbidity (NTU)	0.3 - 12	< 0.2	92 - > 99%

\*Trihalomethane Formation Potential

Table 1 - Summary of Test Results

## **PARTNERSHIP IN POLLUTION PREVENTION AND RESOURCE CONSERVATION**

The demonstration of this technology was partially supported by the Ontario Ministry of the Environment.

Industrial companies located in Ontario may seek ministry/ industry services which will help them:

- \* reduce, reuse and recycle solid waste;
- \* effectively remediate historic pollution and destroy hazardous contaminants;
- \* reduce or eliminate liquid effluent and gaseous emissions;
- \* use energy and water more efficiently.

Equipment and services supply companies can benefit from the information provided on technologies identified for business development.

## **FOR FURTHER INFORMATION, PLEASE CONTACT**

Phil Canning  
Manager, Process Engineering  
Zenon Environmental Inc.  
845 Harrington Court  
Burlington, Ontario  
L7N 3P3  
Tel. (905) 639-6320  
Fax (905) 639-1812

George Cadete  
Environmental Partnerships Branch  
Ministry of the Environment  
2 St. Clair Ave. W., 14th Floor  
Toronto, Ontario  
M4V 1L5  
Tel. (416) 327-1258  
Fax (416) 327-1261  
E-Mail: cadetege@ene.gov.on.ca

## **MINISTRY OF THE ENVIRONMENT SERVICES**

For information on Ministry of the Environment assistance to industry, please contact the Environmental Partnerships Branch at  
(416) 327-1492, Fax (416) 327-1261

For more project profiles and other publications, visit the ministry's website at <http://www.ene.gov.on.ca>

---

*This project profile was prepared and published as a public service by the Ontario Ministry of the Environment. Its purpose is to transfer information to Ontario companies about new environmental technologies.*

*Publication of this project profile does not imply product endorsement. The ministry does not warrant the accuracy of the contents and cannot guarantee or assume any liability for the effectiveness or economic benefits of the recommendations or the technologies described herein or that their use does not infringe privately owned rights.*

*In addition, the ministry cannot be held liable for any injury or damage to any person or property as a result of the implementation of any part of this profile.*

*Pour tout renseignement en français au sujet du programme d'écologisation industrielle du Ministère de l'Environnement, veuillez composer le 416-327-1253, télécopieur 416-327-1261.*





